WHAT I CLAIM IS:-

1. A plural-dimensional displacement measuring system for an apparatus having a bed (10), a first stage (12) movable in a first direction (Y) relative to the bed and a second stage (18) movable in a second direction (X), generally at right angles to the first direction, relative to the first stage, the measuring system employing a first interferometer system (Fig. 5A) for measuring linear displacement generally in the first direction between a first reference reflector (66) and a first target reflector (70) fixed relative to the first stage and producing a corresponding first output signal, a second interferometer system (Fig. 5B) for measuring linear displacement generally in the second direction between a second reference reflector (72) and a second target reflector (82) fixed relative to the second stage and producing a corresponding second output signal, and means (64) for processing the output signals to determine linear displacement of the second stage relative to the bed in the first and second directions,
characterised in that:-
the second interferometer system includes a intermediate reflector (74) fixed relative to the first stage and is arranged to produce a beam (98,100) that extends generally in the first direction from a position fixed relative to the bed to the intermediate reflector and that, upon reflection thereby, extends generally in the second direction from the intermediate reflector to the second target reflector.

2. A measuring system as claimed in claim 1, wherein the intermediate reflector comprises a pentaprism (74).

3. A measuring system as claimed in claim 1, and employing a third interferometer system (Fig. 5C) for measuring angular displacement of the first stage relative to bed and producing a corresponding third output signal.

4. A measuring system as claimed in claim 3, wherein the third interferometer system includes a pair of target reflectors (76,78) and is arranged to produce a pair of beams (108,110) that extend generally in the first direction from a position fixed relative to the bed to the pair of reflectors.

5. A measuring system as claimed in claim 3, wherein the processing means is operable to take the third output signal into account in determining the linear displacement of the second stage relative to the bed in the first direction.

6. A measuring system as claimed in claim 3, wherein the processing means is operable to take the second and third output signals into account in determining the linear displacement of the second stage relative to the bed in the first direction.

7. A measuring system as claimed in claim 1, wherein at least one of the interferometer systems is of the Jamin type employing a Jamin beam-splitting block (50) for splitting a source beam (34X;34Y;34A) into first and second projected beams (84,86;96,98;108,100) and for combining reflections of the projected beams into a first interferogram beam (90;102;112) and a second interferogram beam (92;104;114).

8. A measuring system as claimed in claim 7, wherein at least two of the interferometer systems are of such Jamin type, employing different levels in a common such beam-splitting block.

9. A measuring system as claimed in claim 1, further including a means (32) for producing a laser beam (34) and a beam-splitter (40) for splitting the laser beam into a plurality of source beams (34X,34Y,34A) for at least two of the interferometer beam systems.

10. A measuring system as claimed in claim 1, in combination with an apparatus having a bed (10), a first stage (12) movable in a first direction (Y) relative to the bed and a second stage (18) movable in a second direction (X), generally at right angles to the first direction, relative to the first stage.

11. A method of setting up a measuring system having a bed (10), a first stage (12) movable in a first direction (Y) relative to the bed, a second stage (18) movable in a second direction (X), generally at right angles to the first direction, relative to the first stage, and a plural-dimensional displacement measuring system employing a first interferometer system (Fig. 5A) for measuring linear displacement generally in the first direction between a first reference reflector (66) and a first target reflector (70) fixed relative to the first stage and producing a corresponding first output signal, a second interferometer system (Fig. 5B) for measuring linear displacement generally in the second direction between a second reference reflector (72) and a second target reflector (82) fixed relative to the second stage and producing a corresponding second output signal, and means (64) for processing the output signals to determine linear displacement of the second stage relative to the bed in the first and second directions, the second interferometer system including a intermediate reflector (74) fixed relative to the first stage and arranged to produce a beam (98,100) that extends generally in the first direction from a position fixed relative to the bed to the intermediate reflector and that, upon reflection thereby, extends generally in the second direction from the intermediate reflector to the second target reflector, the method comprising the steps of:

adjusting the orientation of the first interferometer system so that the measuring direction thereof is parallel to the direction of movement of the first stage relative to the bed; and adjusting the orientation of the first stage at a reference position so that the direction of movement of the second stage relative to the first stage at that reference position is parallel to the measuring direction of the second interferometer system.